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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,775	12/29/2004	Nobuo Ishii	01165.0931	7307

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EXAMINER	
DHINGRA, RAKESH KUMAR	

ART UNIT	PAPER NUMBER
1763	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/519,775	ISHII ET AL.	
	Examiner	Art Unit	
	Rakesh K. Dhingra	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) *6-8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-8* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/04,08/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Election/Restrictions

Applicant's election of Group I (apparatus) and species 1 (Figure 3) [with claims 1-5 reading on the elected invention and species] in the reply filed on 3/16/07 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Accordingly claim 6-8 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention/species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Matsumoto et al (JP 2001 – 320227).

Regarding Claim 1: Matsumoto et al teach a microwave plasma apparatus (Figure 1) comprising:

A processing chamber 1a, a microwave oscillator 20, an antenna 10a, a waveguide 21, a microwave adjustment machine 30 (load matching device), a directional coupler 35 (like a wave detector) and a control section 34 (controller) for controlling the impedance matching between processing chamber 1a and the microwave oscillator 20 by calculation based on detection values given by directional coupler 35 (paragraphs 0056-0065).

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Ishii et al (US Patent No. 6,311,638).

Regarding Claim 1: Ishii et al teach a microwave plasma apparatus (Figures 1, 4) comprising:

A processing chamber 1, a microwave power generator 4, an antenna 32, a waveguide 35, a load matching unit 41, a reflection coefficient measuring unit 5 (like a wave detector) and a control unit 7 (controller) for controlling the impedance matching between processing chamber 1 and the microwave oscillator 4 by calculation based on detection values given by directional coupler 35 (column 2, line 63 to column 4, line 25).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al (JP 2001-320227) in view of Smith et al (US Patent No. 5,621,331).

Regarding Claims 2, 5: Matsumoto et al teach all limitations of the claim including a controller 34 that controls the impedance matching, but do not teach the controller comprises load matching device adjustment calculation unit and an adjustment signal output unit, and where that adjustment signal includes a calculated amount of adjustment multiplied by a predetermined value smaller than 1.

Smith et al teach a plasma apparatus (Figures 1-3) comprising:

A chamber 110, a waveguide 122, an auto-tuner 102 that includes tuning stubs 130, processor 134 with memory 136 (load matching device adjustment calculation unit + adjustment signal output unit), sensors 132 and a spectrometer 140. Smith et al further teach that stub displacements are scaled (multiplied) by combining the stub displacement with a scaling factor (N) which may be a function of the magnitude of the reflection coefficient associated with the load. Smith et al also teach that scaling factor is typically less than 1. Smith et al additionally teach that process of load matching is continued till impedance of processing chamber matches the impedance of the microwave oscillator (column 5, line 50 to column 7, line 35).

Therefore it would have been obvious to one of skills in the art at the time of the invention to use a controller that comprises a load matching device adjustment calculation unit for calculating an amount of adjustment to which said load matching device should be adjusted in order to match the impedance of said processing chamber with the impedance of said microwave oscillator; and an adjustment signal output unit for transmitting as an adjustment signal a calculated amount of adjustment multiplied by a predetermined value smaller than 1 as taught by Smith et al in the apparatus of Matsumoto et al to provide matching of a source with a non-linear load like plasma.

Regarding Claim 3: Smith et al teach that apparatus also includes a photosensitive detector 138 (plasma detecting device) that indicates if plasma conditions exist, and is coupled to a spectrometer 140

for detecting particular plasma chemistry. Smith et al also teach that data processor 134 (controller) can also execute algorithms which considers stunb positions related to formation of plasma or a particular plasma chemistry (column 9, line 52 to column 10, line 25).

Regarding Claim 4: Smith et al teach apparatus includes processor 134, memory 136 and sensors 132 (adjustment detection unit) that detects adjustment position by which stubs 130 are adjusted and the auto-tuner 102 controller controls said stubs 130 according to a difference between the adjustment signal transmitted from said adjustment signal output unit and the signal of the adjustment position (column 7, line 45 to column 10, line 65).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Ishida et al (US Patent No. 5,079,507) teach a plasma apparatus (Figures 3, 4, 22) comprising:

A controller 50 for controlling the impedance matching operation that includes a CPU 60 that calculates data for insertion lengths of stubs S1, S2, S3 (load matching device adjustment calculation unit) and an interface 65 that generates the pulse signals (based upon input from CPU 60) and transmits to motor drivers 41a, 41b, 41c indicating the required insertion lengths of respective stubs S1 –S3. Ishida et al further teach that CPU 60 while calculating the required insertion length of stubs, uses a desirable reflection coefficient (like a pre-determined multiplier) [column 8, line 30 to column 9, line 25].

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rakesh Dhingra

Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763